

WHAT IS CLAIMED IS:

1. An organic electroluminescent image display apparatus comprising: at least a substrate; and an anode layer, organic layer, barrier conductive layer having optical transparency, and cathode layer having the optical transparency successively disposed on the substrate, the barrier conductive layer being a thin film including at least one of a metal, inorganic nitride, and inorganic oxide formed by a vacuum film forming method in which oxygen is not introduced in a film forming step.

2. The organic electroluminescent image display apparatus according to claim 1, wherein the barrier conductive layer has a moisture-vapor transmission rate of 1 g/m²/day or less, an oxygen transmission rate of 1 cc/m²/day•atm or less, a specific resistance of $1.0 \times 10^{-2} \Omega \cdot \text{cm}$ or less, and an optical transparency of 30% or more in a visible region of 380 to 780 nm.

3. The organic electroluminescent image display apparatus according to claim 1, wherein the barrier conductive layer is a thin film formed of the metal, the metal is at least one of metals having a work function of 4.2 eV or more or an alloy of these metals, and a thickness of the barrier conductive layer is in a range of 10 to 50 nm.

4. The organic electroluminescent image display apparatus according to claim 1, wherein the barrier conductive layer is a thin film formed of inorganic nitride, the inorganic nitride is at least one of nitrides of elements belonging to group 4 of a periodic table, and the thickness of the barrier conductive layer is in a range of 10 to 500 nm.

5. The organic electroluminescent image display apparatus according to claim 1, wherein the cathode layer is constituted of a conductive oxide, and has a thickness in a range of 10 to 500 nm, and an optical transparency in a visible region of 380 to 780 nm is 60% or more.

6. The organic electroluminescent image display apparatus according to claim 1, wherein the anode layer comprises at least one of materials included in a group consisting of at least one of metals having a work function of 4.7 eV or more, an alloy of these metals and conductive inorganic oxides.

7. The organic electroluminescent image display apparatus according to claim 6, wherein the anode layer includes a structure in which a layer formed of the metal or alloy and a layer formed of the conductive inorganic oxide are stacked in order from the substrate side and has a reflectivity.

8. The organic electroluminescent image display apparatus according to claim 6, wherein the anode layer comprises the metal or alloy and has the reflectivity.

5 9. The organic electroluminescent image display apparatus according to claim 1, wherein a sheet resistance of the cathode layer including the barrier conductive layer is 20 Ω / or less.

10 10. The organic electroluminescent image display apparatus according to claim 1, wherein a sheet resistance of the anode layer is 1 Ω / or less.

15 11. The organic electroluminescent image display apparatus according to claim 1, wherein the substrate is any one of a glass substrate, silicon substrate, and polymeric film.

20 12. An organic electroluminescent image display apparatus comprising: at least a substrate; and an anode layer, organic layer, first cathode layer having optical transparency, electron transport protective layer having the optical transparency, and second cathode layer having the optical transparency successively disposed on the substrate,
25 the electron transport protective layer containing an alkali metal and/or an alkali earth metal in a electron transporting organic material.

13. The organic electroluminescent image display apparatus according to claim 12, wherein the first cathode layer comprises the alkali metal and/or the alkali earth metal, and the second cathode layer comprises at least one of an inorganic oxide and an inorganic nitride.

14. The organic electroluminescent image display apparatus according to claim 13, wherein the alkali metal and/or the alkali earth metal constituting the first cathode layer is of the same type as that of the alkali metal and/or the alkali earth metal contained in the electron transport protective layer.

15. The organic electroluminescent image display apparatus according to claim 12, wherein a thickness of the first cathode layer is in a range of 0.1 to 10 nm, and a thickness of the electron transport protective layer is in a range of 3 to 300 nm.

16. The organic electroluminescent image display apparatus according to claim 12, wherein the anode layer comprises a metal or an inorganic oxide which has a specific resistance of $1.0 \times 10^{-3} \Omega \cdot \text{cm}$ or less.

17. The organic electroluminescent image display apparatus according to claim 12, wherein a mol ratio of the

electron transporting organic material and the alkali metal and/or the alkali earth metal constituting the electron transport protective layer is in a range of 1:1 to 1:3.

5 18. The organic electroluminescent image display apparatus according to claim 12, wherein the second cathode layer is formed by a vacuum film forming method in which oxygen is not introduced in a film forming step.

10 19. The organic electroluminescent image display apparatus according to claim 12, wherein the second cathode layer is formed by a sputtering method using an argon gas having an oxygen content volume ratio of 1/300 or less as a sputter gas in a film forming step.

15 20. The organic electroluminescent image display apparatus according to claim 12, wherein the substrate is any one of a glass substrate, silicon substrate, and polymeric film.